ASSOCIATION OF DATA PROCESSING SERVICE ORGANIZATIONS, INC.

MINI/MICRO COMPUTER SEMINAR

APRIL 24-25, 1979

UNDERSTANDING THE MARKET

INPUT
2471 EAST BAYSHORE ROAD
PALO ALTO, CALIFORNIA 94303

INPUT

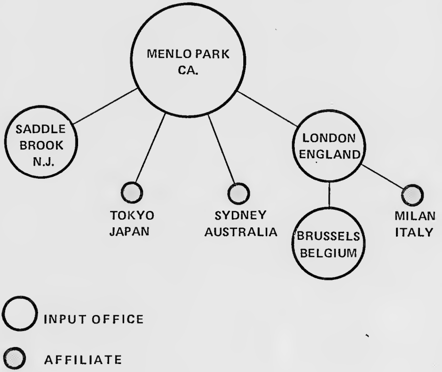
RELATIVE MARKET SIZES

1978

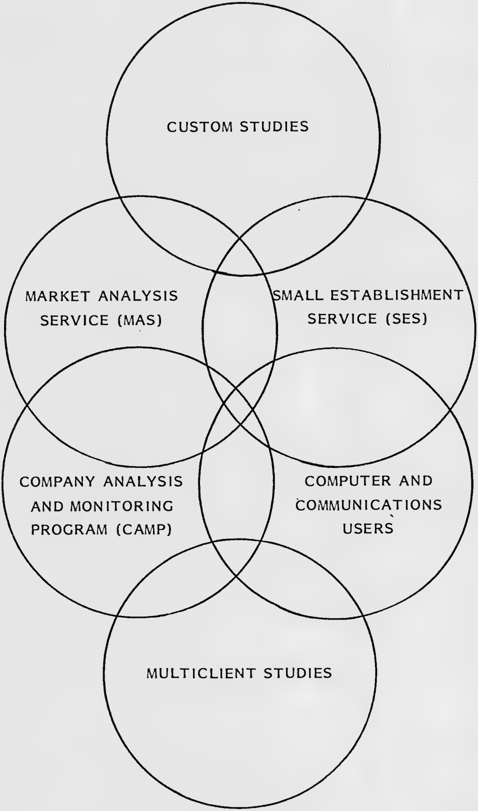
UNITED STATES

• COUNTRY AND WESTERN MUSIC	$ 4 BILLION
• COMPUTER SERVICES	$ 8 BILLION
• VENDING	$11 BILLION

INPUT GEOGRAPHICAL ORGANIZATION

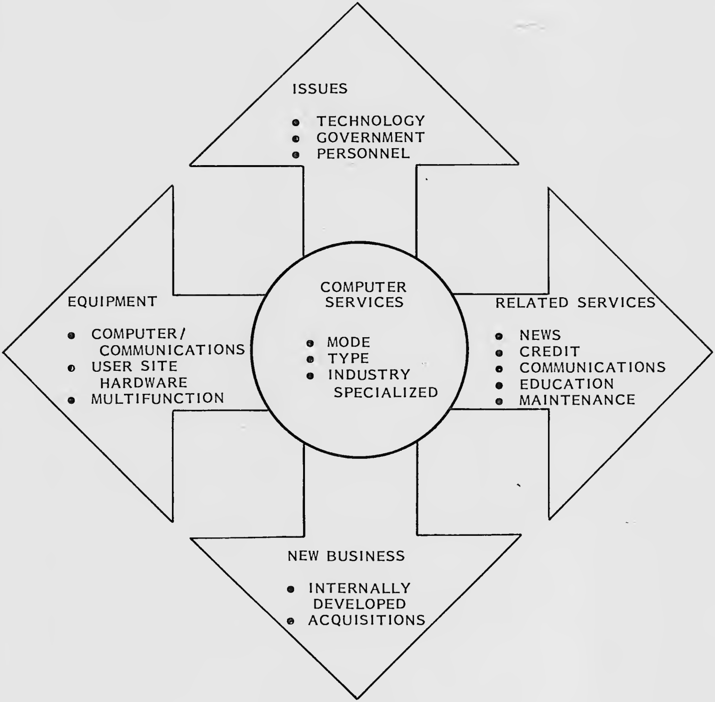


INPUT SERVICES - OVERLAPPING RESEARCH


CUSTOM STUDIES
MARKET ANALYSIS SERVICE (MAS)
SMALL ESTABLISHMENT SERVICE (SES)
COMPANY ANALYSIS AND MONITORING PROGRAM (CAMP)
COMPUTER AND COMMUNICATIONS USERS
MULTICLIENT STUDIES

MARKET ANALYSIS SERVICE

EMPHASIS AREAS

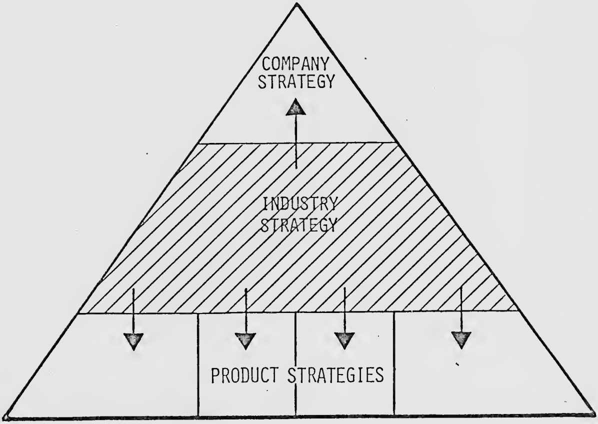


INTERVIEW BASE

- USERS
- VENDORS
- EXPERTS

MARKET ANALYSIS SERVICE

CLIENT USE



MARKET ANALYSIS SERVICE
FOR THE INFORMATION SERVICES INDUSTRY 1975 - 1979

LIST OF CLIENTS

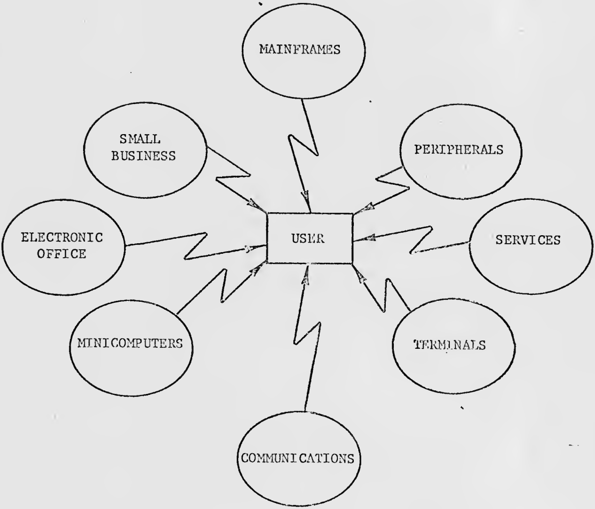
ANACOMP, INC.
AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AUTOMATIC DATA PROCESSING, INC.
BOEING COMPUTER SERVICES COMPANY
CANADA SYSTEMS GROUP
CITIBANK, N.A.
COMPUTEL SYSTEMS LTD.
COMPUTER CONSULTING SERVICE, INC.
COMPUTER SCIENCES CORPORATION
COMPUTER TASK GROUP INC.
CONTROL DATA CORPORATION
DATACROWN, LTD.
DATALINE SYSTEMS, LTD.
DUN & BRADSTREET COMPANIES, INC.
ELECTRONIC DATA SYSTEMS CORPORATION
GENERAL ELECTRIC COMPANY
GRUMMAN DATA SYSTEMS CORPORATION
HONEYWELL INFORMATION SYSTEMS, INC.
IBM CORPORATION
INFOREX, INC.
ITEL CORPORATION
JAPAN INFORMATION PROCESSING DEVELOPMENT CENTER
MCDONNELL DOUGLAS AUTOMATION COMPANY
MERMAQ
NATIONAL CSS, INC.
PLANNING RESEARCH CORPORATION
SOFTWARE AG OF NORTH AMERICA, INC.
SUN INFORMATION SERVICES, INC.
TESDATA SYSTEMS CORPORATION
TYMSHARE, INC.
UNITED COMPUTING SYSTEMS, INC.
XEROX COMPUTING SERVICES

WHAT IS REALLY HAPPENING

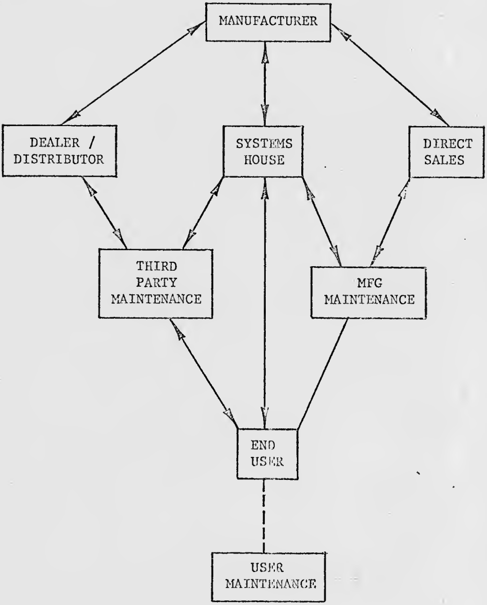
IN THE

MINI/MICRO MARKETPLACE?

USER IMPACTS



MAINTENANCE DISTRIBUTION COMPLEXITIES



INTRODUCTION

DEFINITIONS

- SMALL BUSINESS COMPUTERS
  - DRIVEN BY A MINICOMPUTER
  - UTILIZES 20 MB DISK STORAGE
  - MULTIPLE CRT WORK STATIONS
  - BUSINESS ORIENTED SYSTEM SOFTWARE SUPPORT
  - PERFORMS VARIED GENERAL BUSINESS TASKS

- MINICOMPUTER
  - 16 BIT COMPUTER (COULD BE ON A CHIP)
  - PERFORMS VARIED BUSINESS OR TECHNICAL TASKS

- SYSTEMS HOUSE
  - DEVELOPS TURNKEY SYSTEMS CONSISTING OF HARDWARE AND SOFTWARE
  - MAY OR MAY NOT OFFER HARDWARE/SOFTWARE MAINTENANCE AND SUPPORT

- HARDWARE INTEGRATOR
  - DEVELOPS INTERFACE ELECTRONICS AND CONTROLLERS FOR MINICOMPUTERS AND PERIPHERALS

  - SPECIAL PURPOSE EQUIPMENT INCLUDES WORD PROCESSORS, POS, AND BANKING TERMINALS, ETC.

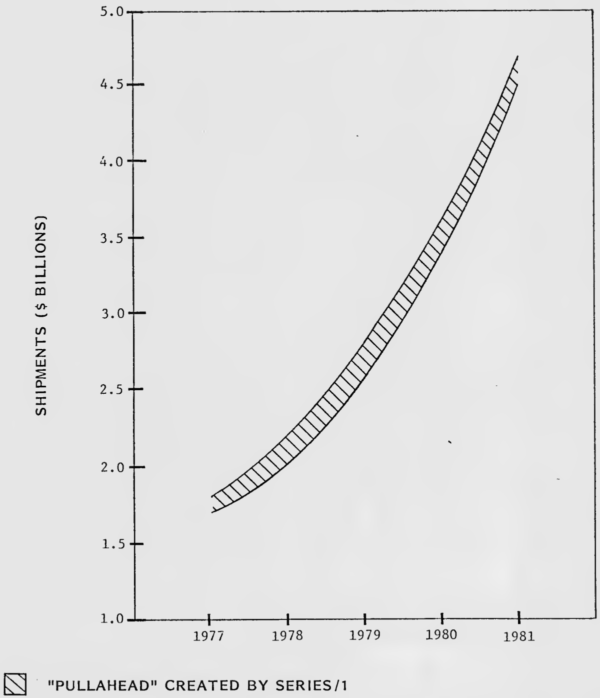
DRIVING FORCES

- WAGE INCREASES
  - A $5 PER HOUR MINIMUM WAGE
  - WAGE INCREASES AT 7 PERCENT AAGR: DOUBLE IN 10 YEARS
  - WHILE: MINICOMPUTER/SMALL BUSINESS COMPUTER SYSTEMS DECREASE OR LEVEL IN PRICE

- INCREASED GOVERNMENT CONTROL AND REPORTING REQUIREMENTS AT ALL LEVELS
  - HEALTH
  - AGE
  - MANPOWER INVENTORY

- COMMUNICATIONS
  - COSTS: FAIRLY CONSTANT ENCOURAGING DDP
  - DEMAND FOR INCREASE IN COMMUNICATIONS
  - VOLUME DEMANDS BROAD BAND IN METROPOLITAN AREAS

FORECASTED UNITED STATES MINICOMPUTER SHIPMENTS



1977 - 1982 POTENTIAL U. S. MINICOMPUTER AND SMALL BUSINESS COMPUTER SYSTEMS MARKET/NON-GOVERNMENT

(UNITS IN THOUSANDS)

LEGEND

A = NUMBER OF EMPLOYEES IN ESTABLISHMENTS WITH MORE THAN 20 EMPLOYEES IN 1977 (MILLIONS)*

B = POTENTIAL: NUMBER OF EMPLOYEES/MINICOMPUTER SYSTEMS BY INDUSTRY (1977)

C = POTENTIAL: MINICOMPUTER DRIVEN SYSTEMS (K) FOR 1977 (A ÷ B)

D = NUMBER OF EMPLOYEES IN ESTABLISHMENTS WITH MORE THAN 20 EMPLOYEES IN 1982 (MILLIONS)**

E = POTENTIAL: NUMBER OF EMPLOYEES/MINICOMPUTER SYSTEMS BY INDUSTRY (1982)

F = POTENTIAL: MINICOMPUTER DRIVEN SYSTEMS (K) FOR 1982 (D ÷ E)

*REFERENCE: 1974 COUNTY BUSINESS PATTERNS WITH 4% ANNUAL GROWTH RATE

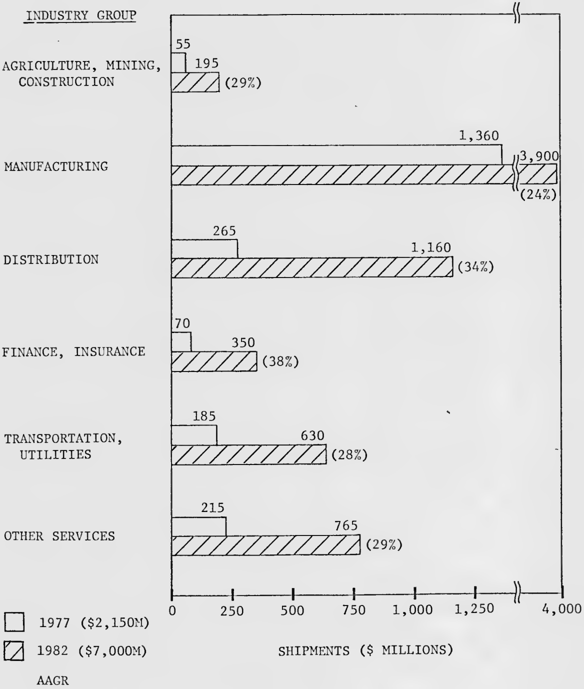
**4% ANNUAL GROWTH RATE

1977 - 1982 POTENTIAL U. S. MINICOMPUTER AND SMALL BUSINESS COMPUTER SYSTEMS MARKET/NON-GOVERNMENT

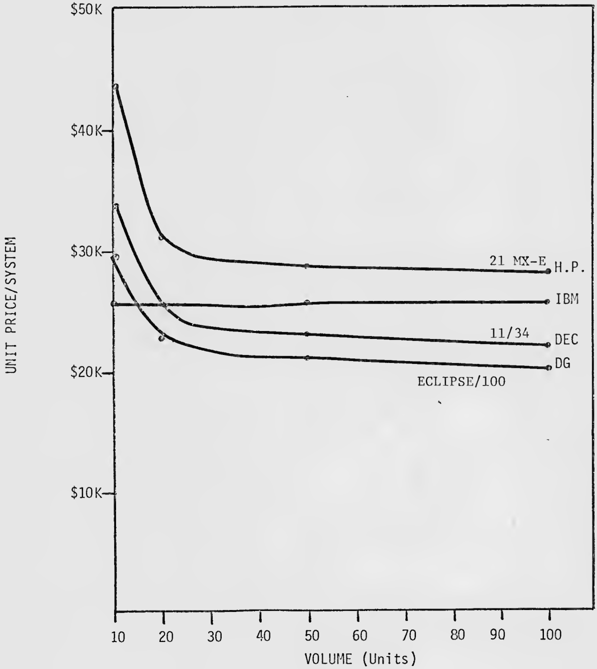
(UNITS IN THOUSANDS)

INDUSTRY	A	B	C	D	E	F
AGRICULTURE	.05	250	.2	.06	–	1.0
MINING	.65	200	3.3	.79	–	5.0
CONSTRUCTION	2.75	150	18.3	3.35	100	33.0
MANUFACTURING, DISCRETE	11.25	30	375.0	13.69	25	560.0
MANUFACTURING, PROCESS	10.35	30	345.0	12.59	25	510.0
WHOLESALE DISTRIBUTION	3.10	50	62.0	3.77	25	150.0
RETAIL DISTRIBUTION	8.05	50	161.0	9.79	35	280.0
FINANCE	1.10	50	22.0	1.34	25	54.0
HEALTH	3.25	50	65.0	3.95	35	111.0
HOTELS	.75	100	7.5	.91	60	15.0
EDUCATION	.90	50	18.0	1.09	35	31.0
INSURANCE	1.30	50	26.0	1.58	30	53.0
LEGAL/ ACCOUNTING	.20	50	4.0	.24	40	6.0
TRANSPORTATION	1.80	30	60.0	2.19	25	88.0
UTILITIES	2.00	30	66.7	2.43	25	100.0
TOTALS	47.50	38 (AVERAGE)	1,234.0	57.77	29 (AVERAGE)	1,997.0

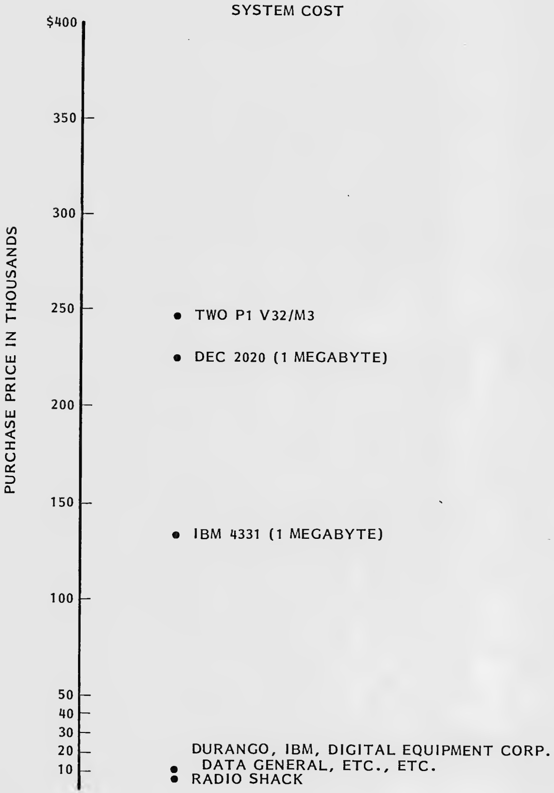
MINICOMPUTER AND SMALL BUSINESS COMPUTER SYSTEMS BY U. S. INDUSTRY GROUP/NON-GOVERNMENT (1977 AND 1982)



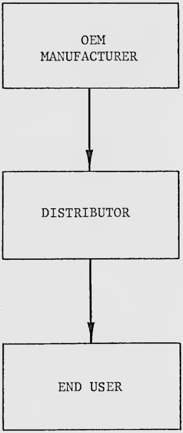
PRICE COMPARISON BASED ON VOLUME DISCOUNT SCHEDULES



MAINFRAME/MINICOMPUTER/MICROCOMPUTER MARKET



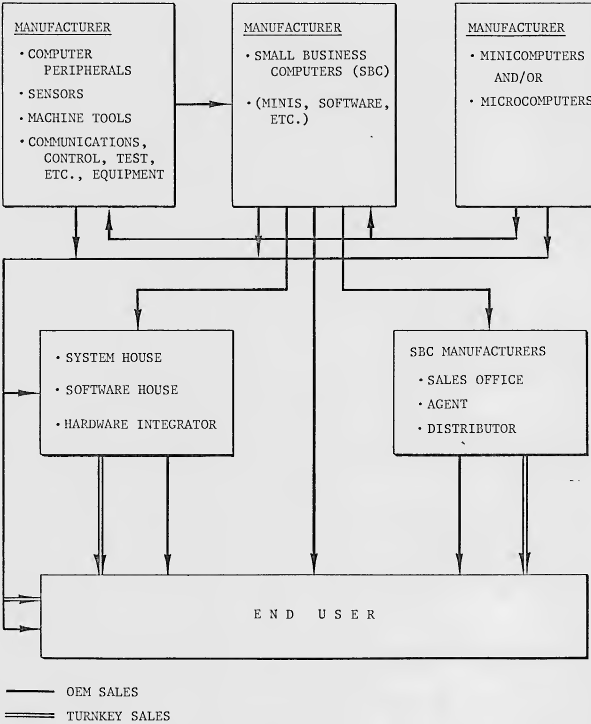
MINI/MICRO COMPUTER CONTROLLED EYSTEMS



AS PERCENTAGE OF RETAIL PURCHASE PRICE:

	MAKE OR BUY	SELLING PRICE	GROSS MARGIN
OEM MANUFACTURER	30%	60%	50%
DISTRIBUTOR	60%	100%	40%
END USER	100%	N/A	N/A

METHODS OF DISTRIBUTION
MINICOMPUTER/SMALL BUSINESS COMPUTER SYSTEMS
DISTRIBUTION PATH



HOW ARE MINICOMPUTERS IMPACTING SERVICE BUREAU AND TIMESHARING BUSINESSES?

IMPACT OF MINI/MICRO COMPUTERS
ON
SERVICE BUREAU AND TIMESHARING BUSINESSES

- GENERAL BUSINESS APPLICATIONS MOST VULNERABLE
  - UP TO 50 PERCENT
- SOME INDUSTRY SPECIALIZED APPLICATIONS EXTREMELY VULNERABLE
  - LAW FIRMS
  - APPAREL MANUFACTURERS
  - BANKING SERVICES
- BATCH SLIGHTLY MORE VULNERABLE
- MEDIUM AND LARGE CUSTOMERS MOST VULNERABLE
- WILL INCREASE THE NEED FOR SOFTWARE AND INTERFACE SOLUTIONS

VULNERABILITY OF RESPONDENTS' BUSINESS TO MINI/MICROCOMPUTERS

TYPE/SIZE OF RESPONDENTS	COMPUTER SERVICES BUSINESS VULNERABLE TO REPLACEMENT BY MINI/MICROCOMPUTERS?			
	NUMBER OF RESPONDENTS "YES"	NUMBER OF RESPONDENTS "NO"	VULNERABILITY	
			AVERAGE	MAXIMUM
PROCESSING SERVICES				
<$2M	105	26	36%	100%
$2-10M	33	10	30	100
$10-25M	10	-	25	50
>$25M	12	*	13	30
SOFTWARE PRODUCTS				
<$2M	7	30	8	50
$2-10M	*	6	8	20
>$10M	*	*	*	*
PROFESSIONAL SERVICES				
<$2M	4	22	16	100
$2-10M	*	7	7	30
>$10M	*	*	*	*
TOTAL	178	109	27%	

*TOTAL NUMBER OF RESPONSES LESS THAN 5.

RESPONDENTS' PROJECTED MINICOMPUTER INSTALLATIONS AT CUSTOMER SITES

TYPE/SIZE	NO. OF COMPANIES IN CELL	MINICOMPUTERS INSTALLED					
		1977		1978		1979	
		NO. OF INSTAL.	MAXIMUM*	NO. OF INSTAL.	MAXIMUM*	NO. OF INSTAL.	MAXIMUM*
PROCESSING SERVICES							
<$2M	133	219	45	565	150	1,231	250
$2-10M	46	486	160	835	300	1,705	600
$10-25M	11	216	185	392	335	527	375
>$25M	16	1,171	1,000	1,692	1,200	2,732	1,500
SOFTWARE PRODUCTS							
<$2M	45	107	23	227	45	424	100
$2-10M	10	6	3	45	15	180	100
>$10M	5	11	10	35	20	125	100
PROFESSIONAL SERVICES							
<$2M	29	56	20	141	40	349	100
$2-10M	10	76	40	141	60	226	90
>$10M	4	11	8	20	15	58	50
TOTAL	309	2,359		4,093		7,557	

*MAXIMUM PER RESPONDENT

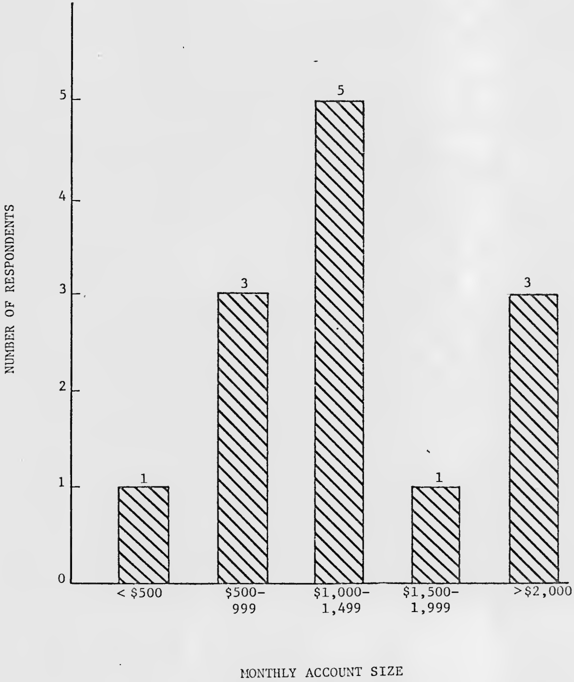
NUMBER OF RESPONDENTS PROJECTING MINICOMPUTER INSTALLATIONS AT CUSTOMER SITES

COMPANY TYPE/SIZE OF RESPONDENTS	TOTAL NUMBER OF RESPONDENTS	NUMBER OF RESPONDENTS WITH INSTALLED MINICOMPUTERS		
		1977	1978	1979
PROCESSING SERVICES				
<$2M	133	36	66	60
$2-10M	46	24	30	33
$10-25M	11	3	5	6
>$25M	16	7	11	12
SOFTWARE PRODUCTS				
<$2M	45	14	17	18
$2-10M	10	3	4	3
>$10M	5	2	2	2
PROFESSIONAL SERVICES				
<$2M	29	9	17	17
$2-10M	10	6	6	5
>$10M	4	2	2	2
TOTAL	309	106	160	158

MINI/MICRO COMPUTER REVENUES
BY
SERVICES COMPANIES IN 1979

- SURVEY RESPONDENTS EXPECT 3,500 INSTALLATIONS IN 1979
- A $15,000 AVERAGE PER INSTALLATION IS EQUIVALENT TO $50 MILLION
- RESPONDENTS REPRESENT ONE-THIRD OF INDUSTRY REVENUES
- THEREFORE, TOTAL IS 150 MILLION
- INDUSTRY 1979 REVENUES EQUAL $9.2 BILLION
- MINI/MICRO COMPUTER REVENUES EQUAL 2 PERCENT OF 1979 TOTAL INDUSTRY REVENUES
- RESPONDENTS ARE LEADERS - SO PROBABLY ACTUALLY LESS THAN 2 PERCENT

RESPONDENTS' MEASUREMENT OF ACCOUNT SIZES VULNERABLE TO MINI/MICRO COMPUTERS



IMPACT ON PROFITS/GROWTH

- MUCH OF REVENUE IS HARDWARE COST. PROFIT DEPENDS ON VALUE ADDED VERSUS COSTS
- GROWTH IN INSTALLATIONS EXPECTED BY CURRENT PARTICIPANTS
  - 73 PERCENT IN 1978
  - 86 PERCENT IN 1979
- TOO EARLY TO PREDICT
  - SOME HAVE WITHDRAWN
  - NEW ENTRIES HESITANT
  - MARKETING, MAINTENANCE, COMMUNICATIONS SOFTWARE ISSUES
- INPUT WILL STUDY
  - 1979 ADAPSO SURVEY
  - 1979 MARKET ANALYSIS SERVICE REPORT

A 1978 DEVELOPMENT - USHS

- USER SITE HARDWARE SERVICES
  - PROGRAMMABLE HARDWARE AT USER SITE
  - ACCESS TO A COMMUNICATIONS NETWORK
  - ACCESS TO RCS VENDORS' LARGER COMPUTERS
  - SIGNIFICANT HARDWARE
- ADP, NCSS, GEIS

DISTRIBUTED DATA PROCESSING SERVICES

ADP AND NCSS HARDWARE OFFERINGS

FUNCTION	ADP	NCSS
SYSTEM		
• MINI	DEC 2020	SYSTEM 3200
• WORD SIZE	36 BIT	32 BIT
• MEMORY (MAX. SIZE)	2.5M BYTES	2M BYTES
• DISC (MAX. SIZE)	1.5B BYTES	2B BYTES
• STANDALONE	NO	YES
• HOST SYSTEM NETWORKING	YES	YES
• VAN NETWORKING (PACKET SWITCHING)	YES	YES
• SALE	NO	YES
• LEASE	YES	YES
• BUNDLED SERVICE	YES	NO
• TERMINALS	16 - 32	1 - 32
• LINE PRINTER	300 - 600 LPM	300 - 1,000 LPM
• ENVIRONMENT	OFFICE	OFFICE
• COST (RANGE)	$10,000 - 16,000/ MO. (24 - 36 MONTH LEASE)	$185,000 - $800,000 (PURCHASE)

DISTRIBUTED DATA PROCESSING SERVICES

ADP AND NCSS HARDWARE OFFERINGS

FUNCTION	ADP	NCSS
SYSTEM (CONTD.)		
MAINTAIN	YES	YES
DOWN LINE PROGRAM LOADING	YES	NOT YET ANNOUNCED
REMOTE FAULT DIAGNOSIS	YES	NOT YET ANNOUNCED
MAINTENANCE	YES	NOT YET ANNOUNCED
MULTI - LEVEL DATA SECURITY	YES	YES
MONITORING SERVICE USAGE	YES	NOT YET ANNOUNCED
SOFTWARE		
OPERATING SYSTEM	DEC	VPS
COBOL	YES	YES
FORTRAN	YES	YES
PL/1	YES	YES
DATA BASE (1)	IPL	NOMAD
FINANCIAL (1)	TSAM, FML	ESL
PROJECT MANAGEMENT (1)	APECS	YES
GRAPHICS (1)	YES	YES
TEXT PROCESSING (1)	YES	YES

MARKET ANALYSIS SERVICE

FOR THE INFORMATION SERVICES INDUSTRY 1975 - 1979

DISTRIBUTED DATA PROCESSING

GEIS AND STSC OFFERINGS

FUNCTION	GEIS	STSC
SYSTEM		
• MINI	TI	UNDECIDED
• NAME	MARKLINK	QUAD 100
• MEMORY (MAX. SIZE)	352,000	1 MILLION
• SALE	YES	YES
• COST	$800 - $3,690/MONTH OR UP TO $93,290 (SALE)	$500,000 TO $1 MILLION
SOFTWARE	FORTRAN, ETC.	APL - PLUS

USER SITE HARDWARE SERVICES

- PLUS
  - PRICE/PERFORMANCE
  - INSTANT DDP
  - "THE BEST OF TWO WORLDS"

- MINUS
  - MAINTENANCE
  - TWO-YEAR TEST CYCLE
  - COMPETITION FROM MANUFACTURERS
  - CULTIVATING THE EDP MANAGER

USER SITE HARDWARE SERVICES (USHS)

MARKET IN THE U.S. 1978-1983

MODE	TYPE	RCS REVENUES 1978 ($M)	AAGR (%)	RCS REVENUES 1983 ($M)	USHS PENETRATION (%)	USHS 1983 ($M)
REMOTE COMPUTING SERVICES	GENERAL BUSINESS	$ 283	23%	805	5-10%	$ 40- 80
	SCIENTIFIC & ENGINEERING	301	16	640	5-10	32- 64
	INDUSTRY SPECIALTY	1,403	21	3,700	10-15	370-555
	UTILITY	720	19	1,740	10-15	175-260
	TOTAL	$2,707	20%	$6,885	9-14%	$617-959

RELATIONSHIP OF MINICOMPUTERS, MICROCOMPUTERS, MAINFRAMES, COMMUNICATIONS, AND SOFTWARE

EDP ENVIRONMENT SUMMARY

- MAINTENANCE, SOFTWARE, AND SUPPORT MORE IMPORTANT THAN HARDWARE
  - INCREASING PEOPLE COSTS
  - DISTRIBUTION OF HARDWARE INCREASES PROBLEMS

- MANAGEMENT MORE DEMANDING OF EDP
  - EDP A COMPETITIVE FACTOR IN BUSINESS
  - MANAGERS FAMILIAR WITH EDP

MARKET ANALYSIS SERVICE

FOR THE INFORMATION SERVICES INDUSTRY 1975 - 1979

TOTAL BUDGETS IN THE ELECTRONIC DATA PROCESSING ENVIRONMENT

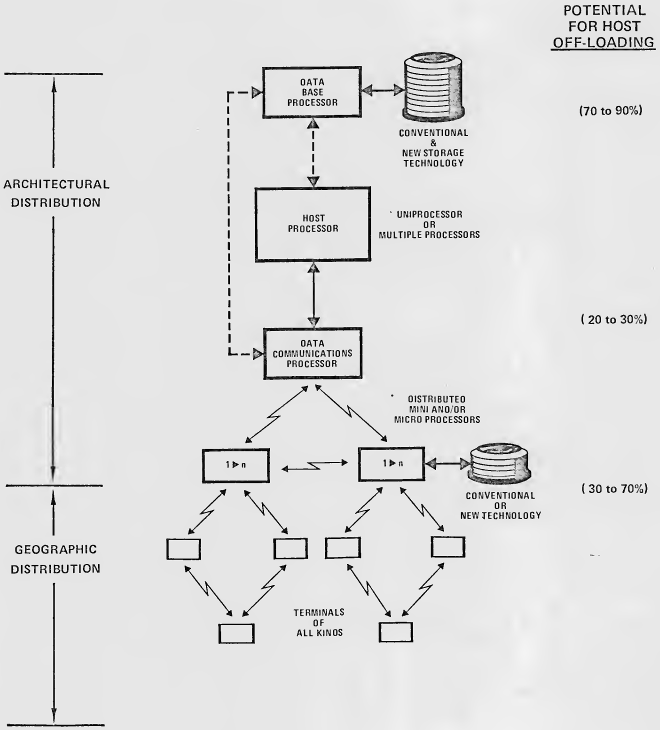
	1965	1976	1982	1987
HARDWARE	48%	35%	30%	22%
OUTSIDE SERVICES AND PROGRAM PRODUCTS	4%	11%	14%	18%
PERSONNEL	48%	44%	42%	40%
DATA COMMUNICATION	*	10%	14%	20%

*INSIGNIFICANT

DISTRIBUTED DATA PROCESSING

- DEFINITIONS
  - DISTRIBUTED PROGRAMMABILITY
  - TELECOMMUNICATIONS NETWORK
  - DISTRIBUTED APPLICATIONS PROCESSING

DISTRIBUTED DATA PROCESSING CONFIGURATION

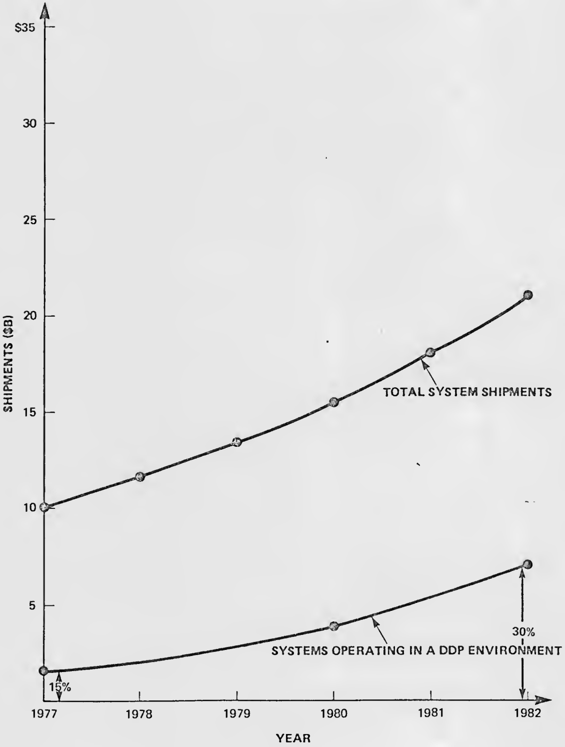

POTENTIAL FOR HOST OFF-LOADING
ARCHITECTURAL DISTRIBUTION
GEOGRAPHIC DISTRIBUTION
DATA BASE PROCESSOR
CONVENTIONAL & NEW STORAGE TECHNOLOGY
(70 to 90%)
HOST PROCESSOR
UNIPROCESSOR OR MULTIPLE PROCESSORS
(20 to 30%)
DATA COMMUNICATIONS PROCESSOR
DISTRIBUTED MINI AND/OR MICRO PROCESSORS
1 ▶ n
1 ▶ n
CONVENTIONAL OR NEW TECHNOLOGY
(30 to 70%)
TERMINALS OF ALL KINDS

DISTRIBUTED DATA PROCESSING SERVICES

ADVANTAGES OF DISTRIBUTED DATA PROCESSING OVER NON-DISTRIBUTED DATA PROCESSING FOR RCS VENDORS

- BETTER CUSTOMER CONTROL
- INCREASED PROFITABILITY (FOR VENDOR)
- CONNECT TIME AND STORAGE CHARGES OPTIMIZED
- AVAILABILITY OF NETWORK FOR OTHER APPLICATIONS
- SHARING OF SOFTWARE RESEARCH AND DEVELOPMENT AND MAINTENANCE COSTS WITH SUPPLIER OF MINICOMPUTERS
- ABILITY TO OFFER CUSTOMER TAILOR-MADE CHOICE BETWEEN STAND-ALONE AND NETWORK SOLUTION

ALL U.S. COMPUTER SYSTEM SHIPMENTS AND SYSTEMS OPERATING IN A DDP ENVIRONMENT (1977–1982)

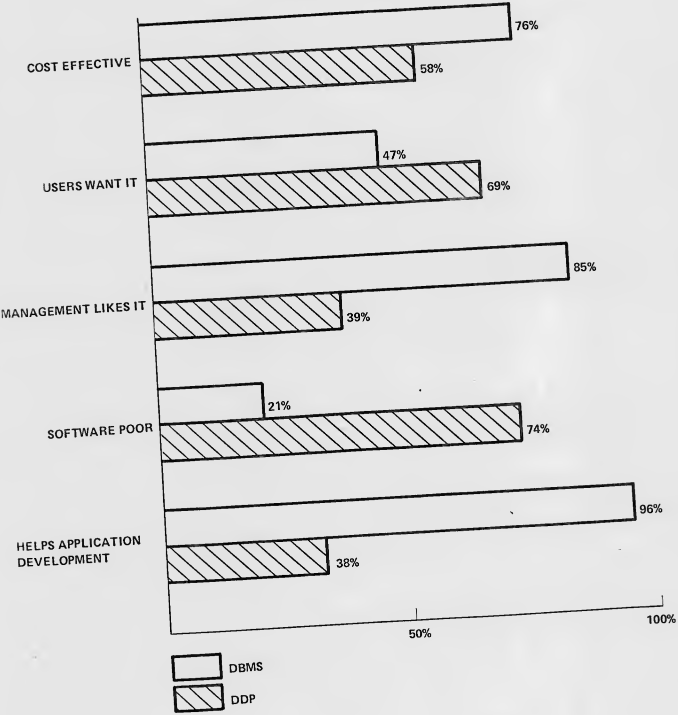


ELECTRONIC DATA PROCESSING MANAGER'S ROLE

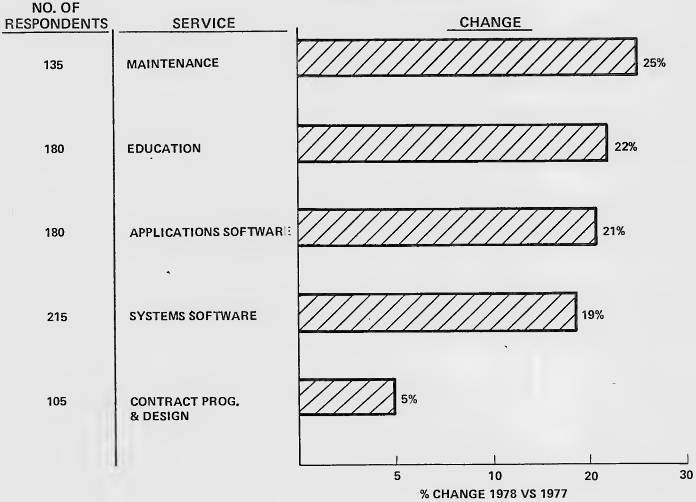
"USERS WILL BECOME AN INTEGRAL PART OF THE DATA PROCESSING SYSTEM. THE MOVEMENT TO ON-LINE SYSTEMS WILL PERMIT DATA ENTRY AT THE SOURCES. THE ROLE OF THE EDP MANAGER WILL CHANGE TO ONE OF MANAGEMENT OF THE INFORMATION RESOURCE WITHIN THE HOSPITAL AND MAINTAINING THE STANDARDIZATION AND INTEGRITY OF THE TOTAL SYSTEM."

- MEANS: YOU CAN'T AVOID EDP MANAGERS FOREVER
- BUT, THEY WILL INCREASINGLY BE MANAGERS, NOT TECHNICIANS
  - MAKE/BUY DECISIONS
  - POLICY MAKERS

EDP MANAGERS ATTITUDES TO DBMS/DDP



EDP MANAGERS
CHANGES IN AVERAGE EXPENDITURES FOR OUTSIDE SERVICES
1978 VS 1977

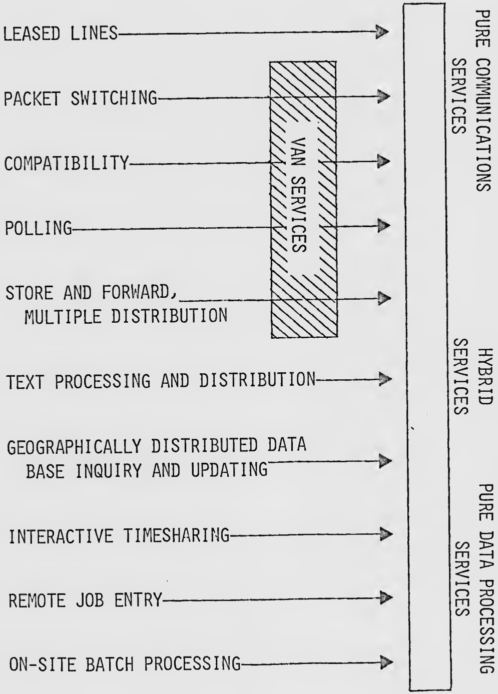


MINI/MICRO COMPUTER DEVELOPMENTS

MANAGEMENT ISSUES - MINICOMPUTER IMPACT

- THREAT
  - 80 PERCENT OF PROCESSING COMPANIES HAVE SOME VULNERABILITY
  - AVERAGE 30 PERCENT VULNERABLE
  - LARGE COMPANIES AVERAGE 13 PERCENT
  - GENERAL BUSINESS/UTILITY MOST VULNERABLE
  - ACCOUNT SIZE IMPACT $1,000 PER MONTH
  - TECHNOLOGY REDUCES THRESHOLD TO $500 PER MONTH

VAN SERVICES RELATED TO THE SPECTRUM OF COMMUNICATIONS TO DATA PROCESSING SERVICES


LEASED LINES
PACKET SWITCHING
COMPATIBILITY
POLLING
STORE AND FORWARD, MULTIPLE DISTRIBUTION
TEXT PROCESSING AND DISTRIBUTION
GEOGRAPHICALLY DISTRIBUTED DATA BASE INQUIRY AND UPDATING
INTERACTIVE TIMESHARING
REMOTE JOB ENTRY
ON-SITE BATCH PROCESSING
VAN SERVICES
PURE COMMUNICATIONS SERVICES
HYBRID SERVICES
PURE DATA PROCESSING SERVICES

SOFTWARE ISSUES

SYSTEMS SOFTWARE

- SOFTWARE IS THE CONTROL POINT, NOT HARDWARE

- IBM'S HARDWARE/FIRMWARE/SOFTWARE STRATEGY
  - PROTECTS HARDWARE
  - DISCOURAGES PLUG COMPATIBLES
  - RELATED TO SECURITY
  - ALREADY STARTED (MVS EXTENDED FUNCTION)

SOFTWARE ISSUES

APPLICATIONS SOFTWARE

- DEMAND FOR APPLICATION SOFTWARE GREATER THAN EVER
  - COMPLEXITY INCREASING
  - LIMITS HARDWARE SALES
  - BASED ON OUTDATED LANGUAGES
  - NEW TOOLS AND TECHNIQUES (AUTOMATED APPLICATION DEVELOPMENT) ON THE WAY
- MAINTENANCE OF APPLICATIONS SOFTWARE INCREASING PROBLEM

DATA BASE MANAGEMENT SYSTEMS

- MUCH OF FUTURE DBMS WILL BE IN HARDWARE FOR PERFORMANCE IMPROVEMENT
- MOST USERS WILL HAVE MORE THAN ONE DBMS
- MASSIVE DATA BASE CAPABILITY TO EMERGE
- EASIER APPLICATION DEVELOPMENT AND ENGLISH LANGUAGE PRIME THRUSTS OF IBM

DISTRIBUTED DATA PROCESSING
USER CHARACTERISTICS

- SAVINGS CLAIMED BY ALMOST HALF OF DDP USERS
- COULD NOT QUANTIFY SAVINGS
- TWO METHODS OF INSTALLING DDP
  - INITIAL DESIGN
  - SECONDARY ACTIVITY
- DRIVING FORCES
  - DISSATISFACTION WITH CENTRAL DATA PROCESSING
  - SLOW MAINFRAME LOAD INCREASES

DISTRIBUTED DATA PROCESSING

ISSUES

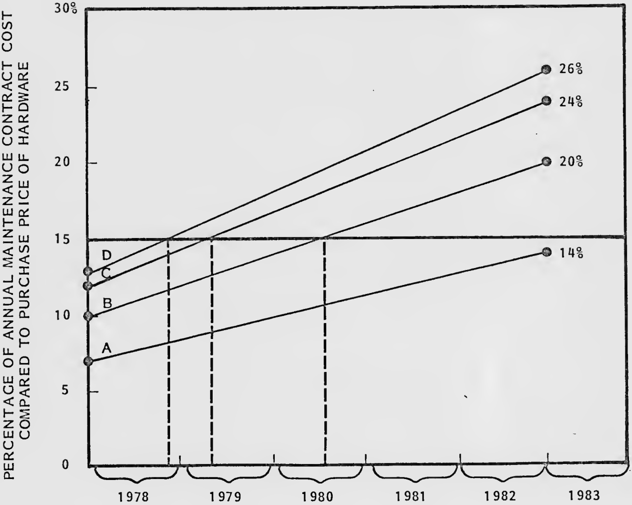
- CENTRALIZED CONTROL OF EQUIPMENT PROCUREMENT AND SYSTEM SPECIFICATION WILL CONTINUE
- AVAILABLE DBMS SYSTEMS LIMIT DDP ACCEPTANCE AND GROWTH
- REMOTE SITE TRANSPARENCY MAY BE FREQUENTLY REQUIRED
- COMMUNICATIONS AND NETWORKING ARE NOT WELL UNDERSTOOD
- RCS VENDORS MAY HAVE A MAJOR ROLE TO PLAY IN OFFERING DDP SERVICES TO SMALL USERS

FORECASTED MAINTENANCE REVENUE AND PERSONNEL

1978 - 1983 (U.S. ONLY)

YEAR	MAINTENANCE REVENUE ($ BILLIONS)	MAINTENANCE PERSONNEL (THOUSANDS)		ANTICIPATED MANPOWER (THOUSANDS)
		INPUT FORECAST	VENDOR PROJECTION	SHORTAGE (DIFFERENCE)
1978	$4.8	90	90	-
1979	5.5	99	103	4
1980	6.4	110	119	9
1981	7.3	123	137	14
1982	8.4	136	157	21
1983	10.0	151	180	29
AAGR	15%	11%	15%	-

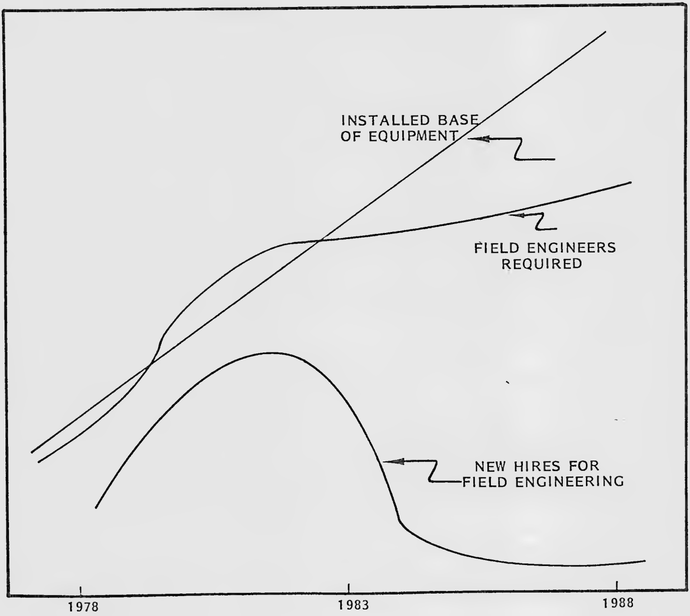
FORECASTED GROWTH OF ANNUAL MAINTENANCE
CHARGES FROM VENDOR PROJECTIONS



A = LARGE MAINFRAME SYSTEMS
B = MINICOMPUTERS, TERMINALS, AND OTHER
C = SMALL BUSINESS EQUIPMENT
D = PERIPHERALS

15% AAGR

PROJECTED GROWTH OF FIELD ENGINEERS VS. INSTALLED BASE

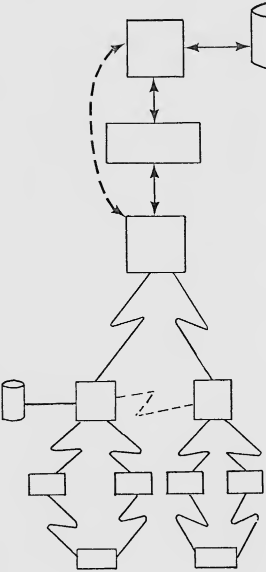


IBM FUTURE

EDP BUDGETS AND IBM REVENUE SOURCES

	EDP BUDGETS		IBM'S REVENUE DERIVATION
	1976	1987	1976
HARDWARE	35%	22%	95%
OUTSIDE SERVICES & PROGRAM PRODUCTS	11	18	5
PERSONNEL	44	40	-
COMMUNICATIONS	10	20	-
TOTAL	100%	100%	100%

IBM FUTURE
CURRENT & PROJECTED PRIORITIES



TECHNOLOGY	PRIORITY CURRENT	PRIORITY 1982	PRIORITY 1987
SECONDARY STORAGE & MEMORY	④	④	②
PCM 370/30XX	①	⑦	⑥
MVS/IMS VTAM	③	②	⑦
370X 3790 MINIS TERMINALS	②	①	④
WORD & TEXT PROCESSING	⑤	③	①
REMOTE COMPUTING SERVICES	⑥	⑥	⑤
MICROS	⑦	⑤	③

USER PERSPECTIVES AND RECOMMENDATIONS

INPUT

THE FINANCIAL ANALYSIS PROCEDURE

IF A FINANCIAL ANALYSIS WAS PERFORMED PRIOR TO ACQUIRING A SMALL BUSINESS COMPUTER, WHAT FACTORS WERE CONSIDERED?		WAS A POST-AUDIT OF THE FINANCIAL ANALYSIS COMPLETED?		
	NUMBER OF RESPONSES	NUMBER OF RESPONSES		
		YES	NO	DON'T KNOW
Hardware & Maintenance	8	2	5	1
Hardware, Software & Maintenance	1	0	0	1
Hardware, Software, Maintenance & Personnel	3	2	1	0
No Analysis Performed	11	0		2
Don't Know If Performed	12	2	0	13
TOTALS	35	6	15	14

DECISION CYCLE TIME

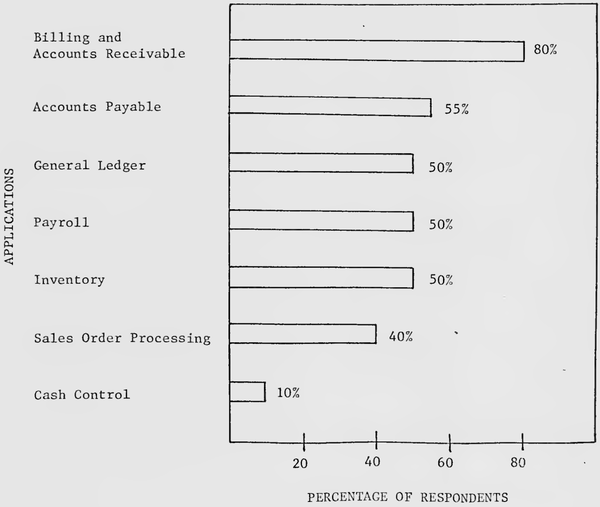
PERIOD	MONTHS		
	Minimum	Median	Maximum
Evaluation Start to Decision	2	7.5	36
Decision to Installation Completion	0.4	3	13

IMPORTANCE OF FACTORS IN CHANGING FROM A SERVICE TO A SMALL BUSINESS COMPUTER

FACTOR	USERS' RATING OR FACTOR (1=unimportant 10=critical)		
	1 - 3	4 - 7	8 - 10
Reliability of System	0	2	14
Applications Programs Availability	10	3	3
Network Availability	13	2	1
Compiler Availability	5	3	8
Assembler Availability	7	4	5
Operating System Availability	3	7	6
Offering of Turnkey	8	4	4
Rentals (30 Days)	12	2	2
Leases (1, 2, 3 Years)	12	3	1
Cost Per Period Comparison	2	4	10

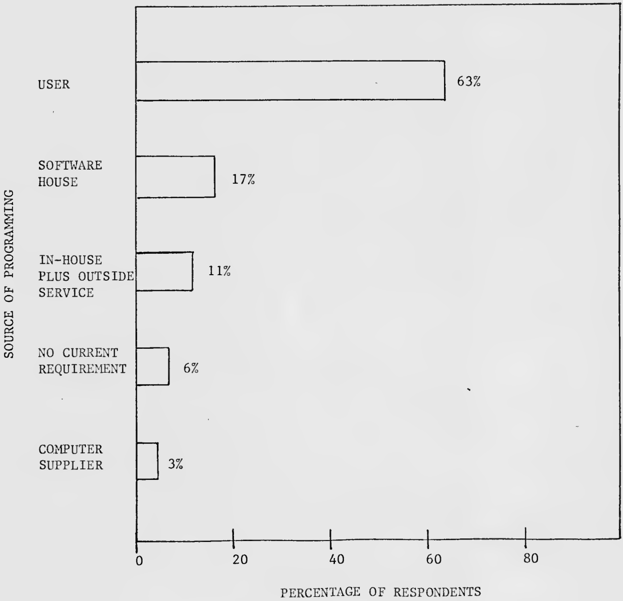
GENERAL BUSINESS APPLICATIONS IN USE ON SMALL BUSINESS COMPUTERS

(IN MORE THAN 10% OF THE INSTALLATION SAMPLE)



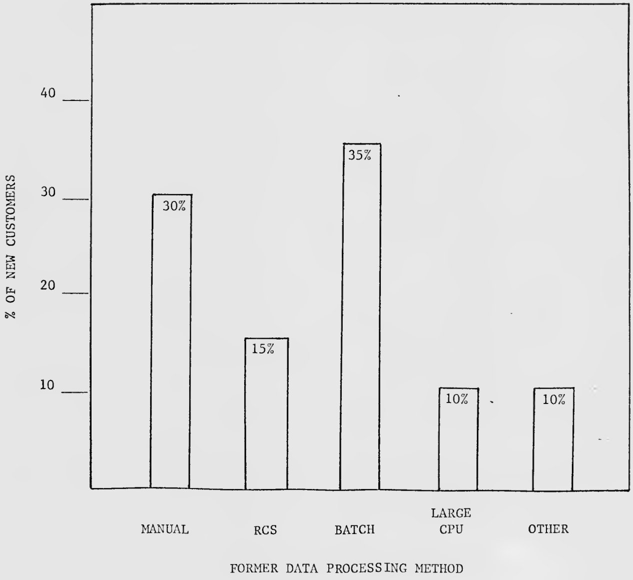
SOURCE OF APPLICATIONS PROGRAMMING

SUBSEQUENT TO INITIAL INSTALLATION



DISTRIBUTION OF RESPONDENTS' NEW CUSTOMERS BY

FORMER DATA PROCESSING METHOD



OVERVIEW OF 1976-1980 PRODUCT AND PRICE TRENDS

AS REPORTED BY OUR SELECTED SAMPLE

AVERAGE FOR SYSTEMS SHIPPED	1976	1980	% CHANGES
Systems Operating in a Communications Environment	3%	30%	900%
Hardware Price	\$55,000	\$52,000	-5
Disk Drive Capacity System	25M Bytes	70M Bytes	180
Number of Visual Display/ Stations System	3	9	200

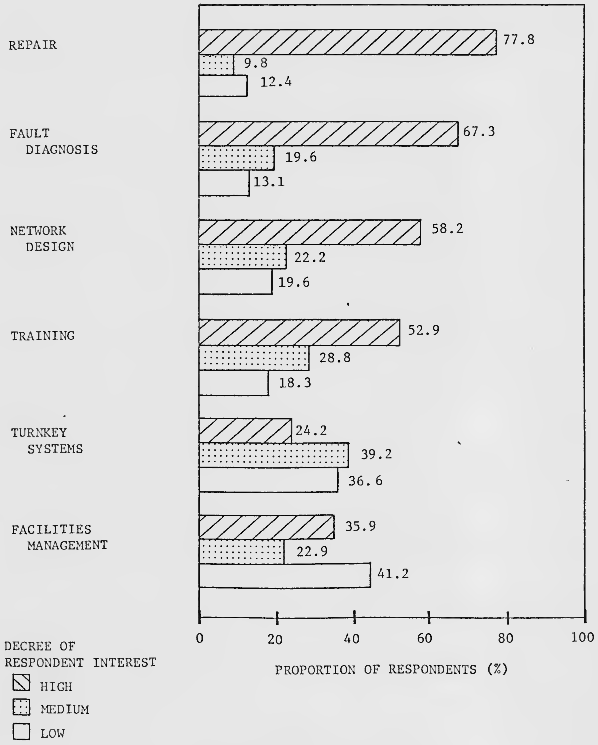
RELATIVE IMPORTANCE OF USHS VENDOR CHARACTERISTICS AS PERCEIVED BY RESPONDING USERS

CHARACTERISTICS	RELATIVE RANKING	NUMBER OF RESPONDENTS		
		VERY IMPORTANT	SOME IMPORTANCE	LOW IMPORTANCE
VENDOR'S SOFTWARE CAPABILITY	1	14	2	2
VENDOR'S NETWORK CAPABILITY	7	5	4	7
ABILITY TO TURNKEY	6	8	2	7
MAINTENANCE CAPABILITY	3	11	5	1
VENDOR'S INDUSTRY KNOWLEDGE	9	3	4	11
VENDOR'S REPUTATION	4	10	5	2
PRODUCT PRICE/ PERFORMANCE	2	13	2	2
VOLUME DISCOUNTS	8	4	5	6
HARDWARE CAPABILITY	5	10	4	1

COMMUNICATIONS

VALUE ADDED NETWORK SUPPORT SERVICES WANTED

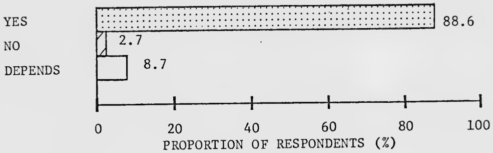
ALL COMPANIES



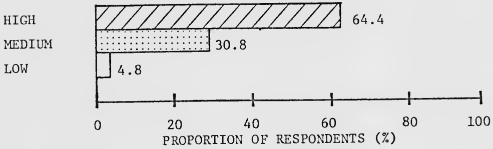
COMMUNICATIONS

RESPONDENTS' ATTITUDES TOWARD PRIVACY/SECURITY

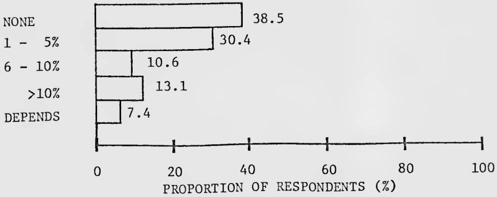
IS IT IMPORTANT?



DEGREE OF IMPORTANCE

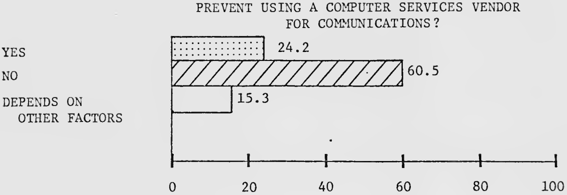


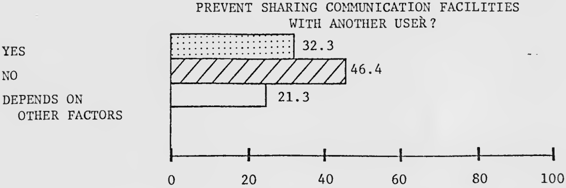
PREMIUM FOR END-TO-END ENCRYPTION



COMMUNICATIONS

RESPONDENTS' ATTITUDES TOWARD PRIVACY/SECURITY





PROPORTION OF RESPONDENTS (%)

COMMUNICATIONS

RESPONDENTS' ATTITUDES TOWARD PRESENT AND POTENTIAL SUPPLIERS OF VAN SERVICES

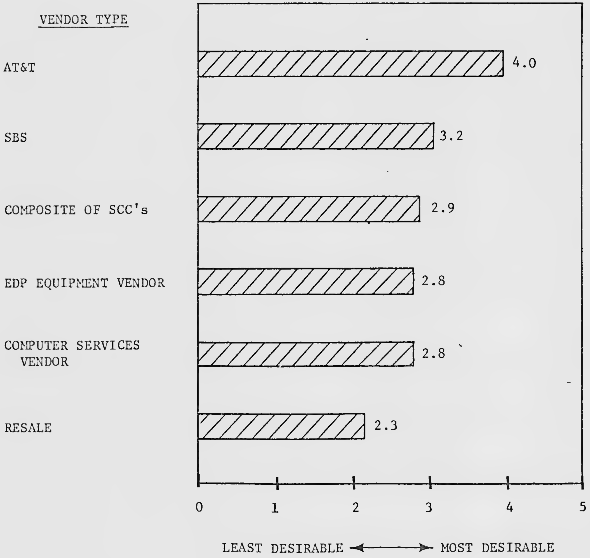
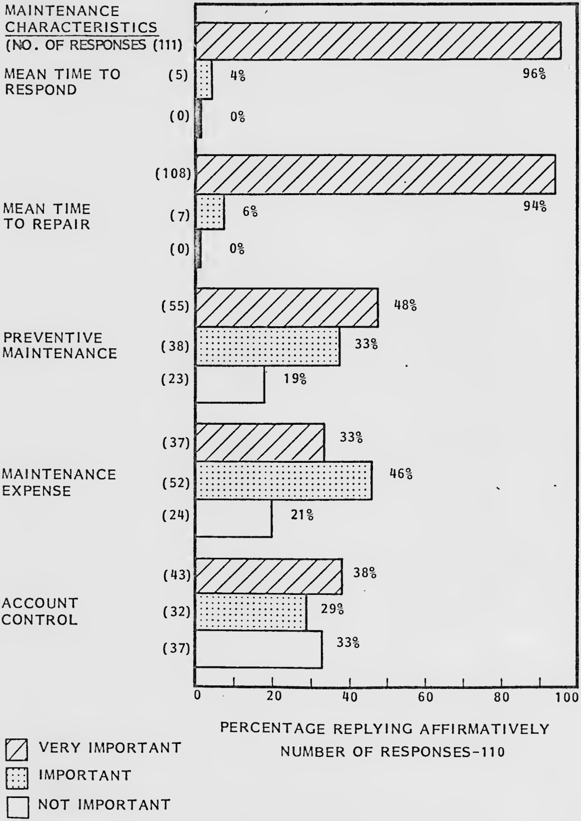
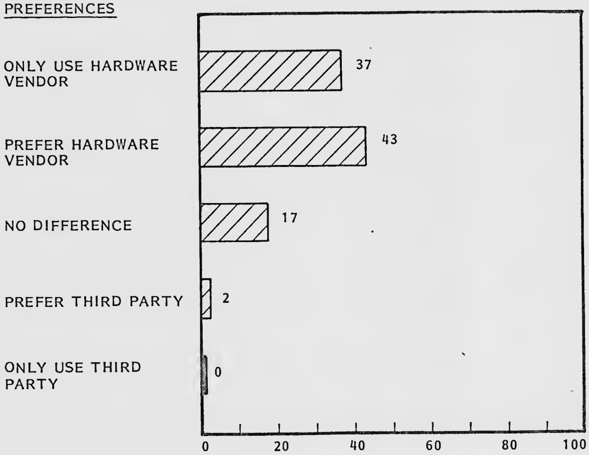


EXHIBIT IV-9

RESPONDENT USERS' RATING OF THE IMPORTANCE OF FIELD MAINTENANCE CHARACTERISTICS



RESPONDENT USERS' PREFERENCE FOR MAINTENANCE VENDOR



PERCENTAGE REPLYING AFFIRMATIVELY

NUMBER OF RESPONDENTS-110

OPPORTUNITIES AND RECOMMENDATIONS

MARKET/TECHNOLOGY

- TARGET ALL INFORMATION PROCESSING
  - DATA TEXT AND GRAPHICS
  - DISTRIBUTED AND NON-DISTRIBUTED
  - USE INFORMATION FLOW ANALYSIS
- EXPLOIT COMMUNICATIONS
  - OFFER SERVICES, EXPERTISE
  - REMOVE BARRIERS
- WORK WITH HARDWARE COMPANIES
  - SPECIAL HARDWARE
  - MARKETS FOR SOFTWARE
  - ACQUISITIONS
  - NETWORK SUPPORT

OPPORTUNITIES AND RECOMMENDATIONS

MARKET/TECHNOLOGY

- PRICING
  - SELL A SERVICE, NOT A PRODUCT
  - UNBUNDLE - SHOW SOME REDUCTION
- POSITION TO PARTICIPATE IN SERVICE MARKETS FOR THE 1980S
- SUPPORT SERVICES MARKETS FOR THE 1980S
  - MAINTENANCE OF SOFTWARE
  - MAINTENANCE OF HARDWARE
  - EDUCATION
  - TRAINING
  - DOCUMENTATION
  - EVALUATION
  - AUDITING

CONCLUSIONS - 1

- MINI/MICRO COMPUTER MARKETPLACE GROWING
- WILL CONTINUE TO GROW
- SMALLER SERVICES COMPANIES VULNERABLE
  - GENERAL BUSINESS
  - BATCH
- SOFTWARE IS INCREASINGLY AVAILABLE
- IN THE LONGER TERM, COMMUNICATIONS IS THE KEY
  - TECHNICAL QUESTIONS
  - REGULATORY QUESTIONS
  - SATELLITE BUSINESS SYSTEMS
  - DISTRIBUTED DATA PROCESSING

CONCLUSIONS - 2

- INDUSTRY SUB-SECTOR SPECIALIZATION IS A VIABLE STRATEGY FOR SERVICES COMPANIES
  - HIGHER VALUE ADDED
  - SELL SOLUTIONS, NOT HARDWARE
  - SMALLER ESTABLISHMENTS BECOMING VIABLE
- SALES AND SUPPORT TRAINING AND ORGANIZATION ARE CONSIDERATIONS
  - HARDWARE VERSUS SERVICES BIAS
  - TIMING OF A CLOSE
- MAINTENANCE CANNOT BE A LONG-TERM LOSS ELEMENT

CONCLUSIONS - 3

- HARDWARE WILL CONTINUE TO BE LESS EXPENSIVE
  - SERVICES COMPANIES MUST HAVE A STRATEGY
  - THE ANSWERS ARE NOT SIMPLE
- SUCCESS WILL BE FOR THOSE WHO SELECT THE OPTIMUM SOLUTIONS
  - USER NEEDS
  - MARKETING
  - COMMUNICATIONS/HARDWARE/SOFTWARE